

Working Group (AK) RE Patterns: REPARE - The Requirements Engineering Patterns Repository

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REPARE (<http://repare.desy.de>) was developed as a platform for RE knowledge transfer based on patterns. The Web-based repository aims at making good RE practices available for project teams on the job. It targets practitioners from small and medium organizations without dedicated RE resources.

Introduction

The results of the working group (AK) RE Patterns on discovering and communicating reliable RE experience in the form of patterns were presented at last year's SIG RE (FG-RE) meeting [1]. The collected patterns are now published in the RE Pattern Repository REPARE which offers filtering and navigation functionality. REPARE provides access to patterns which are applicable in a given project situation by querying for pattern characteristics like e.g. the RE activity which is supported by the pattern, the RE role that executes the activity or the quality goal that should be reached.

RE Patterns

RE patterns generalize comparable observations of successful RE activities from different projects into a structured format. Patterns are derived from two or more similar observations in different projects (see Figure 1).

The structure which is used for analyzing and documenting observations and RE patterns [2] saves pairs of problems and solutions, where problem statements are specified explicitly in terms of two conflicting forces. The forces are directly reflecting to conditions or situations which are encountered by project managers. The solution section of a pattern proposes an action to solve this conflict by compensating the forces. The essence of an RE pattern is captured in a "pattern vector",

$$P = (T, F^{\leftarrow}, F^{\rightarrow}, A),$$

where T is an RE task, F^{\leftarrow} and F^{\rightarrow} are the two conflicting forces which create the problem, and A is an action compensating the forces.

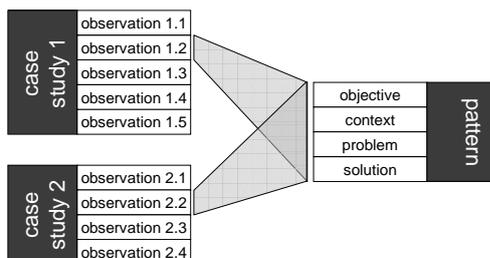


Figure 1: Conceptual pattern model.

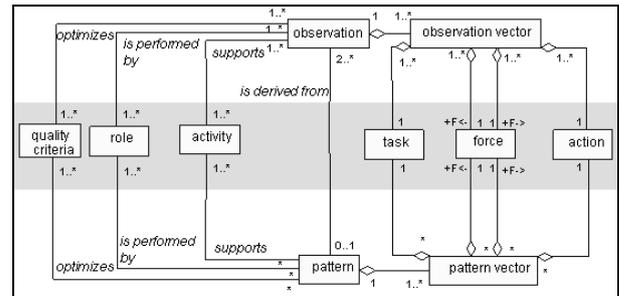


Figure 2: REPARE data model.

REPARE -The RE Pattern Repository

REPARE (repare.desy.de), the RE pattern repository, uses the pattern vector for storing and filtering observations and patterns. The resulting class diagram is shown in Figure 2: It enables access to patterns and observations – i.e. to practical RE experience – filtered by any combination of characteristics and vector elements (grey box in Figure 2).

The search form for finding patterns (see Figure 3) is built as a cloze text for building queries which allows users to fill in the blanks. REPARE returns a list of patterns that provide RE experience with regard to the given criteria in combination with optional additional free search terms. For the search clause shown in Figure 3 it returns four patterns:

- Use Prototypes for Specifying Innovative Products**
 Designing innovative products requires stakeholders with strong imagination and good technical understanding. This pattern recommends using prototypes for improving the project team's knowledge and experience in state-of-the-art technologies.
- Organize Specification along Project Structure**
 This pattern recommends using the same structures for project management and requirements elicitation to minimize coordination efforts.
- Detail the Specification Documents by Writing Test Cases**
 If a specification turns out to be ambiguous or incomplete while a project is already well on its

I am looking for Requirements Engineering Patterns which ...

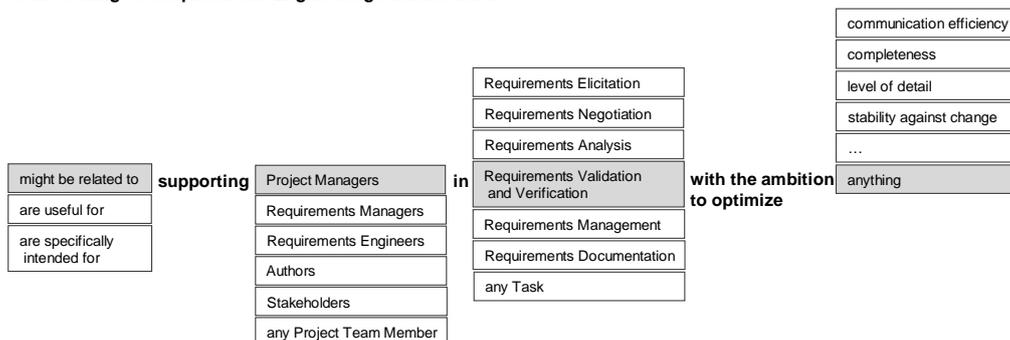


Figure 3: REPURE search clause.

way, this pattern describes a way of clarifying the specification without halting the implementation work.

- **Employ a Requirements Engineer as a Care Taker**

If requirements engineering efforts are growing so large that project teams are no longer able to accommodate them in their daily business with satisfactory quality, a dedicated requirements engineer should be established as a central person for performing RE activities.

By choosing more or less descriptors and modifying the threshold it is possible to gradually change the precision of the request. Restricting the search to approaches which focus on improving “completeness” instead of “anything” reduces the result set to the “Detail the Specification Documents by Writing Test Cases” pattern”.

For each pattern, a short structured overview is available which links to the pattern’s full text for download. The long version includes additional information on implementation details and possible consequences.

In addition to the search functionality, REPARE provides hyperlinks for navigation to related patterns and to the case studies on which the pattern is based. Discussion forums invite users to provide feedback on individual patterns or the repository itself.

An „RE maturity test“ (see Figure 4), which is currently in the test phase, can be employed for assessing the requirements process maturity in an organization. First, it is determined whether the conflicts addressed by the known patterns are present in the organization and if they are controlled. Then it is examined whether the conflicts are specifically controlled because of the patterns. The number of present and controlled conflicts serve as an indicator of the RE process quality, while conflicts purposefully controlled by patterns would indicate process reproducibility. REPARE then computes strengths and weaknesses and makes recommendations about which RE patterns could improve the project’s RE quality.

Results and Outlook

REPARE has so far concentrated on making existing experience available and accessible to a wider public. Future versions will feature more interactive features like the RE maturity test or functionalities for providing case studies and finding patterns through the Web.

The pattern collection is still relatively small, but quarterly RE pattern workshops address RE experience for specific topics, like e.g. contracting requirements (client-supplier relationships) or requirements reuse. They are currently held in Germany, but may also be conducted in conjunction with an international conference.

References

- [1] L. Hagge, K. Lappe, “Report from the Working Group on Requirements Engineering Patterns”, Softwaretechnik-Trends 24, 4 (2004).
- [2] L. Hagge, K. Lappe, Sharing Requirements Engineering Experience Using Patterns, IEEE Software, 1(2005).

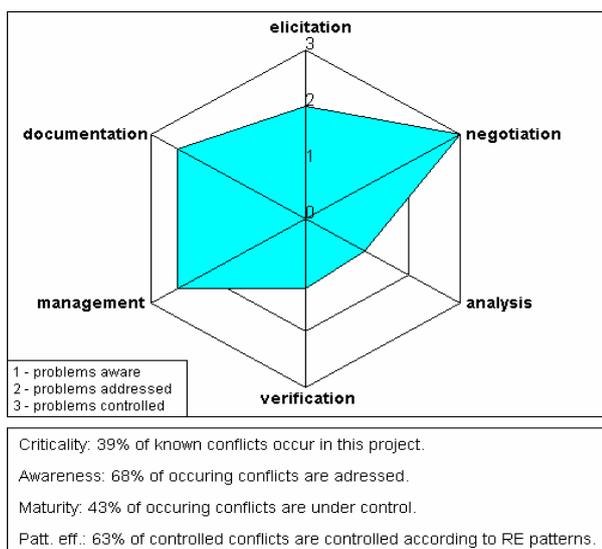


Figure 4: Sample RE maturity test results.